Joint Polar Satellite System (JPSS) System Architecture

"Suomi NPP to the Future"

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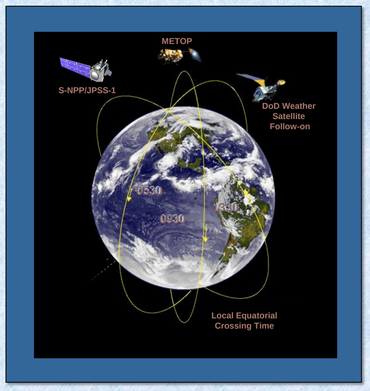
S-NPP Launched 28 October 2011

Environmental Monitoring in Support of Civil and Defense Applications

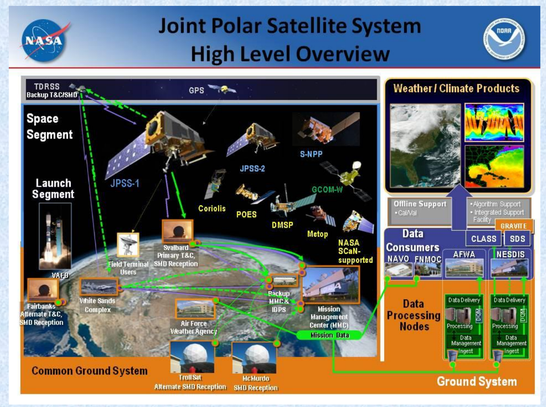
Features
- Rapid data delivery with science mission data download at both poles (JPSS-1 and beyond)
- Quickly react to changing conditions
- 10 times the data
- More accurate data for better forecasts
- International collaboration

Benefits
- Critical inputs to weather forecast models
- Science quality data to users including research scientists
- Continuity of climate data records



NOAA through NASA, as its acquisition agent, will procure the afternoon orbit assets that support its civil weather and climate requirements and DoD will independently procure assets for the morning orbit military mission. Both agencies will continue to share environ- mental measurements made by the system and support the operations of a shared common ground system.

Our valuable international partnership with the Europeans will remain for support of the mid-morning orbit, and NOAA will continue to pursue additional partners for inclusion into the system. Some work remains in developing the JPSS ground architecture. JPSS-1 is scheduled for launch in the 2nd quarter of FY17 and JPSS-2 will be ready for launch in the 1st quarter of FY22.



Summary of Mission Attributes

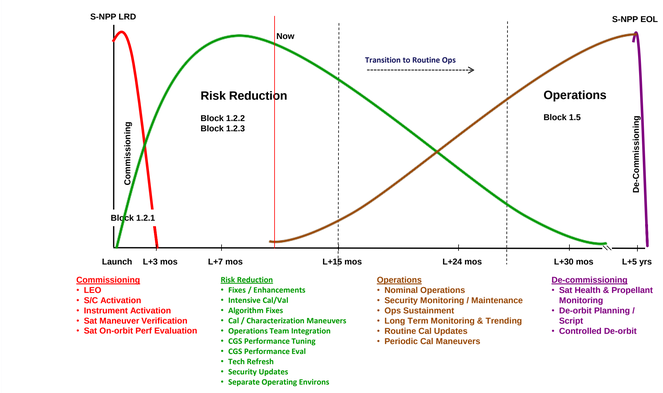
Full life cycle mission operations supported by a full set of JPSS Ground System services

Missions	Mission Orbit	Launch	Payloads	Mission Communications	Data Latency
S-NPP	824 km, 1330 LTAN, Polar Sun-Synchronous, 16 day Repeat Cycle	ULA – Delta II (Vandenberg)	VIIRS, CrIS, ATMS, OMPS-N, OMPS-L, CERES	SMD: X band, 300 Mbps, Svalbard/Fairbanks/Troll HRD: X band, 15 Mbps T&C: S band, Svalbard/Fairbanks/Troll, TDRSS	140 minutes
JPSS-1	824 km, 1330 LTAN, Polar Sun-Synchronous, 16 day Repeat Cycle, **Mission Constellation with S-NPP**	ULS - Delta-II (Vandenberg)	VIIRS, CrIS, ATMS, OMPS-N, CERES	SMD: Ka band, 300 Mbps, Svalbard & McMurdo, Fairbanks, Troll **SMD Backup: Ka band, 150 Mbps, TDRSS** HRD: X band, 15 Mbps T&C: S band, Svalbard/Fairbanks/Troll, TDRSS	**80 minutes**
JPSS-2	824 km, 1330 LTAN, Polar Sun-Synchronous, 16 day Repeat Cycle, **Mission Constellation with S-NPP and JPSS-1**	TBD (Vandenberg)	VIIRS, CrIS, ATMS, OMPS-N, OMPS-L, CERES Follow-on (objective)	SMD: Ka band, 300 Mbps, Svalbard & McMurdo, Fairbanks, Troll **SMD Backup: Ka band, 150 Mbps, TDRSS** HRD: X band, 15 Mbps **LRD: L band, 4 Mbps** T&C: S band, Svalbard/Fairbanks/Troll, TDRSS	80 minutes

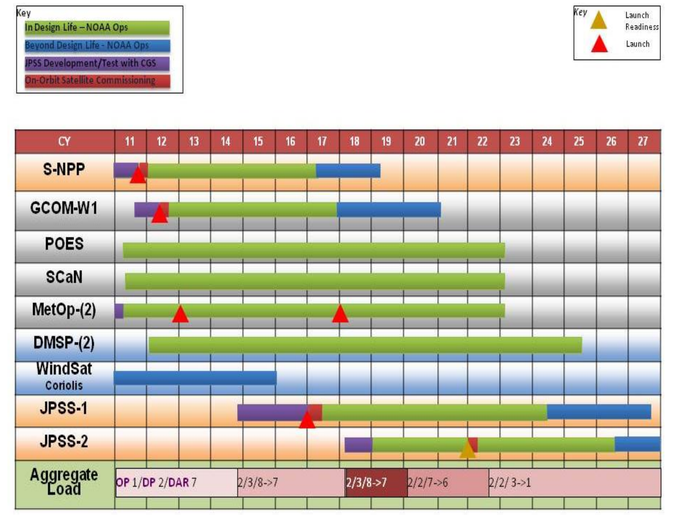
SMD - Stored Mission Data, HRD – High Rate Data, T&C – telemetry and Command

The key differences in the mission architecture from S-NPP are in **bolded** text.

JPSS Ground System Evolution and S-NPP On-Orbit Mission Phases



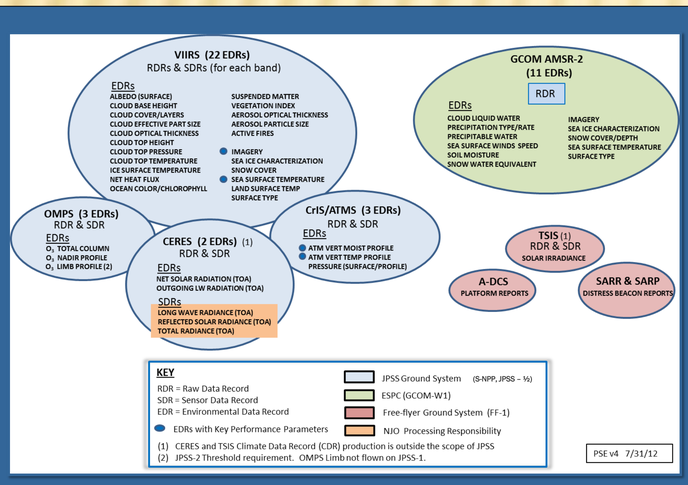
Mission Support TimeLines



OP - Operational Processing
DP - Data Processing – SDR/EDR
DAR - Data Acquisition and Routing

JPSS | DoD | International

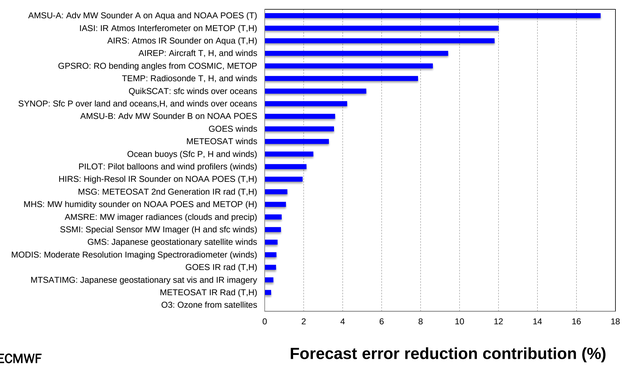
JPSS Environmental Product Production



Suomi NPP

CrIS and ATMS Provide Essential Atmospheric Sounding Information

Hyperspectral Infrared Sounders (CrIS) and Advanced Microwave Sounders (ATMS) are the top two contributors for reducing forecast errors



From ECMWF

Mission Data Rates and Volumes

Mission Data Rates and Volumes from Svalbard Station

Mission	Downlink Rate (Mbps)	Passes per Day	Data Volume per Day (GB)	Outbound Rate (Mbps)	Notes
S-NPP	300	14	100	90	
JPSS-1	300	14	55	90	½ orbit of data
GCOM-W1*	10	14	1.6	90	

Mission Data Rates and Volumes from McMurdo Station

Mission	Downlink Rate (Mbps)	Passes per Day	Data Volume per Day (GB)	Outbound Rate (Mbps)	Notes
JPSS-1	300	14	55	43 - 49	½ orbit of data
DMSP*	7	14	6	1 - 7	Outbound rate depends on mission priority
Metop*	70	14	21	5 - 20	Outbound rate depends on mission priority

*JPSS-supported missions

Daily Mission Data Volumes from Data Processing Node at ESPC

Mission	RDR (GB)	xDR Generation (GB)	xDR Delivery (GB)	Notes
S-NPP	100	4,600	11,140	S-NPP today generates 3,480 GB daily excluding RIPs
JPSS-1	110	5,110	12,374	With higher resolution CrIS/CrIMSS
GCOM-W1	1.6	n/a	7	RDR only
Total	**212**	**9,710**	**23,521**	**At Block 2.0**

Notes:
1. xDRs include RIPs
2. DPN at ESPC delivers xDR to GRAVITE, SDS (RDR only), CLASS, and NDE. NDE ingests only ~40% of total xDRs